Zoo Animal Welfare Assessment

A review of current research and protocols concerning welfare assessment and feasibility of application in a zoo environment

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En genomgång av befintlig forskning och protokoll för välfärdsbedömning samt tillämpning i djurparksmiljö

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Abstract

Modern zoos work with conservation, education and research which are all affected by the welfare status of the animals. This makes animal welfare assessment in a zoo environment important. The aim of this study was to evaluate the main existing protocols and related research concerning welfare assessment, both for zoo and farm animals, in order to analyse the challenges that exist when working with welfare assessment in a zoo environment. This study was performed by looking at example welfare assessment protocols from the European Association of Zoos and Aquaria (EAZA) and protocols developed for farm animals by the Welfare Quality® project. Also, related research on the topic was investigated.

Welfare assessment is exercised through different methods, looking at both behavioural and physiological measures. The approach recommended by the World Association of Zoos and Aquariums (WAZA) is the Five Domains model which include both physical domains and a mental domain that represents the subjective feelings and experiences of an animal.

Welfare Quality® uses four welfare principles that each comprise two to four welfare criteria. These criteria are checked using measures that have been developed for specific species. A comparison between the example protocols from EAZA and the Welfare Quality® protocols for farm animals showed that the Welfare Quality® protocols were more covering and that just one zoo example protocol covered all criteria used by Welfare Quality®.

One difficulty when assessing welfare in a zoo environment is the huge amount of species kept in zoos that all need their specific protocols and assessment criteria. Another difficulty is the great individual variation within species due to for example different backgrounds and facilities. Furthermore, it can be hard assessing the welfare of wild animals due to difficulties with behavioural measures and the handling process.

In order to incorporate improvement of zoo animal welfare in an overall welfare assessment of zoo animals, a suggestion of two additions to the welfare criteria of Welfare Quality® was made. The suggested addition to the list of welfare criteria are “Encouraging foraging behaviour through nutritional enrichment” and “Reproductive success”.

To further develop the welfare assessment of zoo animals, an investigation on how different example protocols for zoos work in practice should be made since such an investigation could give information to further develop welfare principles and criteria specific for a zoo environment. Furthermore, collaboration between zoos should be extended. Both between zoos with high level of resources to cooperate in making more species-specific measures and protocols, but also between these zoos and zoos with less resources that might need help with their work concerning welfare assessment.

1. Introduction

1.1 Why assess animal welfare in a zoo environment?

Modern zoos work with conservation, education and research and these areas should be covered by all member zoos of EAZA (European Association of Zoos and Aquaria) (EAZA, 2006). The work with conservation is affected by the welfare of the animals since poor welfare can affect both breeding and reintroduction to the wild. Side effects of poor welfare such as stress, suppression of immune function and decrease of productive fitness will affect this work. When working with education, zoos want to display animals showing natural behaviour to both educate and engage the public. The possibility to show natural behaviour is also relevant for animal welfare. To learn more about wild animals and do research we want to look at animals with good welfare who are healthy and show natural behaviours to represent their wild conspecifics. Additionally, zoos that gain a positive perception by the public often get more visitors which leads to a greater opportunity to promote education (Davey, 2007).

Assessing the welfare of zoo animals also give opportunities for improvement of animal welfare and management and can be used to (Wild Welfare, 2016):

1. obtain factual input for management decisions,
2. obtain unbiased management information,
3. know factually if the zoo (facility) is at risk,
4. identify areas of opportunity,
5. improve continuous communication and motivation,
6. assess individual performances based on facts,
7. assess the status and capability of infrastructure,
8. assist with training of all staff.

Even though various methods, such as behavioural assessment, physiological or cognitive indicators and review of husbandry and veterinary records, have been used to assess the welfare of zoo animals (Blackett *et al.,* 2017) no truly consistent method has been presented.

1.2 Assessing animal welfare

It is important to have a reliable assessment tool to improve animal welfare (Webster, 2013). To provide assurances on animal welfare, certification schemes have been developed in several countries (Veisser *et al.,* 2008). These certification schemes may use different approaches to provide this assurance on animal welfare such as resource-based approach, outcome-based approach and continuous improvement-based approach (Main *et al.,* 2014).

The resource-based approach defines the requirements of the resources that are important for an animal (Mench, 2008). The outcome-based approach focuses on assessing the health and behaviour of the animal in addition to prescribing inputs (Main *et al.,* 2014). The continuous improvement-based approach includes requirements for a continuous improvement of the welfare and requires pre-defined criteria to be monitored regularly (Main *et al.,* 2014).

To be able to assess both the physical and social aspects of how an animal perceives its environment, a combination of welfare indicators that are related to production system, husbandry routines and animal behaviour and health is suggested for the assessment of farm animal welfare (Bracke *et al.,* 1999). Studying the behaviour of an animal and the choices it makes when facing a situation or environment could indicate if it has access to its needs or not (Dawkins, 2003). The health of an animal is important since for example disease can be

associated with negative experiences of an animal such as pain, discomfort or distress (Fregonesi & Leaver, 2001).

1.3 Welfare Quality®

Welfare Quality® was a European Union-funded project which aimed to develop a standardized system for the assessment of animal welfare, develop a standardized way to convey measures into animal welfare information and develop practical strategies/measures to improve animal welfare (Blokhuis *et al.*, 2010). The seven livestock species involved in the project were dairy cattle, beef cattle, veal calves, sows, fattening pigs, laying hens and broilers (Canali & Keeling, 2009).

Since Welfare Quality® is a fully developed system agreed by a large group of scientists (Blokhuis *et al.*, 2013) it is used as a reference in this study to help develop welfare assessment in a zoo environment.

2. Aim and questions

The aim of this study was to evaluate the main existing protocols and related research concerning welfare assessment, both for zoo and farm animals. It specifically aimed to analyse the challenges that exist when working with welfare assessment in a zoo environment. The study is meant to be used as ground work for developing suitable welfare assessment protocols for zoo animals.

The questions at issue are:

1. How are current examples of welfare assessment protocols for zoo animals designed?
2. What are the similarities and differences between the examples of protocols for zoo animals and the protocols for farm animals?
3. What difficulties exist when assessing animal welfare in a zoo environment?
4. How can the work with welfare assessment in a zoo environment be continued in the future?

3. Materials and method

The method chosen for this work was a literature study. To answer the questions of the study, literature was gathered from the search engines Web of Sciences, Google Scholar and the library catalogue Primo at the Swedish University of Agricultural Sciences. The search words used to find literature are *welfare assessment, welfare scheme, welfare, assessment, wellbeing, animal welfare, Welfare Quality, zoo, zoo animal, zoo environment, farm animals*. Relevant articles were also found in the references of studied articles.

Beside the scientific articles, literature about the Welfare Quality project and examples of welfare assessment protocols for farm animals were used. Welfare assessment protocols from EAZA used during an animal welfare conference were shared to be used in this work. The latter protocols were reviewed to be compared with the protocols for farm animals to find differences in welfare assessment in these two environments. The protocols from EAZA are attached as Appendix A-D.

4. Results

4.1 The Five Domains

An approach for working with zoo welfare assessment has been developed by Wild Welfare using the Five Domains animal-welfare model, which is also recommended by the World

Association of Zoos and Aquariums (WAZA) for their member zoos and organizations according to their animal welfare strategy (WAZA, 2015). The model has been used to establish the fundamental requirements for the welfare of wild animals in human care in order to assess the animal's welfare (Blackett *et al.*, 2017).

The Five Domains system was developed by Mellor & Reid (1994) who used the Five Freedoms to develop this new system for assessing animal welfare. The overall welfare status of the animal is a result of the combined interactions of these five domains which have evolved since the original development (Mellor & Beausoleil, 2015). In this model four physical domains (nutrition, environment, physical health and behaviour) address the biological function and physical health of the animal while the fifth and mental domain represents the subjective feelings and experiences of the animal (Mellor & Beausoleil, 2015). Working with this model means that the welfare state of the animal will be good when it experiences positive emotions due to good nutrition, environment, physical health and an ability to perform normal behaviours in addition to the absence of negative feelings such as fear, frustration or pain (Green & Mellor, 2011).

4.2 EAZA protocols

EAZA is working with welfare assessment and different member zoos and national zoo associations have been using different protocols to assess the welfare of their animals. Four assessment protocols given from EAZA were compared in this study. A short description of the four protocols, Appendix A-D, can be seen in Table 1.

Table 1. Comparison between the example assessment protocols from EAZA.

Example protocol	Description
Example A *(Appendix A)*	Species summary. Not an individual assessment. Divided into 3 parts. Part 1 looks at enclosure, husbandry, diet and management. Part 2 looks at behaviour. Part 3 looks at social grouping, reproduction, mortality and morbidity. Assessed by: Animal and Veterinary teams (Part 1), keepers (Part 2) and Animal team and Registrars (Part 3).
Example B *(Appendix B)*	Species summary. Not an individual assessment. Looks into 7 groups of criteria: Veterinary & General Health, Reproduction, Behaviour, Husbandry, Enclosure Features, Climate and General Maintenance. Assessed by: not mentioned.
Example C *(Appendix C)*	Assessment of species or exhibit. Not an individual assessment. Divided into 5 sections: nutrition, environment, physical health, behaviour and management. Assessed by: animal staff/keepers working directly with the animals (nutrition, environment, physical health, behaviour) and animal managers (management).
Example D *(Appendix D)*	4 alternatives (Animal cannot cope, Animal is challenged, Animal is surviving and Animal is thriving) to choose between in the categories Health (physical condition, injury, illness, parasites), Environment (temperature, water & humidity, light, surfaces, cover & privacy, spatial complexity), Behaviour (social, foraging & feeding, species specific, sensory, locomotory) and Stressors (visitors, events, transport, veterinary, sensory, competition). Assessed by: not mentioned.

Even though there was a big difference in how detailed the example protocols were, some parts of the protocols were similar to each other. None of the protocols were made for assessing the welfare of a specific individual, except for possibly Example D where it was

unclear if the assessment was made for an individual or a species. All four example protocols were divided into different parts or categories which included a varying amount of measures.

4.3 Welfare Quality® welfare assessment

Welfare Quality® uses four welfare principles that each comprise two to four welfare criteria (Table 2) (Keeling *et al.*, 2013). In order to check these criteria, measures have been developed for specific species.

To minimize any value-judgements, the assessor classifies the animals according to categories that are illustrated by pictures or video clips, which also enables the assessment to be recorded correctly without veterinary or animal behaviour expertise (Welfare Quality®, 2009).

Table 2. The principles and criteria used as a basis for the Welfare Quality® assessment protocols (Keeling *et al.*, 2013).

Welfare principles	**Welfare criteria**
Good feeding	1. Absence of prolonged hunger 2. Absence of prolonged thirst
Good housing	3. Comfort around resting 4. Thermal comfort 5. Ease of movement
Good health	6. Absence of injuries 7. Absence of disease 8. Absence of pain induced by management procedures
Appropriate behaviour	9. Expression of social behaviours 10. Expression of other behaviours 11. Good human-animal contact 12. Positive emotional state

4.4 Similarities and differences between welfare assessment of zoo and farm animals

To compare the example protocols from EAZA and the welfare assessment by Welfare Quality®, the EAZA protocols were reviewed to see if they had measures to assess the Welfare Quality® criteria. This showed that all four example protocols contained assessment concerning good feeding and good housing. Example B, C and D contained assessment concerning good health. Only Example C contained assessment concerning all criteria on appropriate behaviour (Table 3).

Table 3. An overview of the comparison between example protocols from EAZA and the principles and criteria from Welfare Quality® (Table 2). If there is an "x" in the box, the criteria was assessed in the specific example protocol.

	Welfare criteria											
	Good feeding		Good housing			Good health			Appropriate behaviour			
Example protocol	1	2	3	4	5	6	7	8	9	10	11	12
Example A	x	x	x	x	x				x	x		
Example B	x	x	x	x	x	x	x	x	x	x	x	
Example C	x	x	x	x	x	x	x	x	x	x	x	x
Example D	x	x	x	x	x	x	x	x	x	x		

As seen from Table 3, many of the welfare criteria from Welfare Quality® were actually covered in the example protocols from EAZA but the Welfare Quality® protocols were more detailed since they have been made for a specific species.

4.5 Assessing positive emotions

In order to assess if an animal experiences positive emotions and is not just in a neutral state, indicators of positive welfare should be included in the welfare assessment. Examples of behaviours that might indicate positive emotions are play behaviours and affiliative behaviours that are expressed when an animal is feeling safe, such as allogrooming (Boissy *et al.,* 2007).

5. Discussion

5.1 Difficulties when assessing welfare in a zoo environment

5.1.1 Amount of species and background

Zoos around the world keep a large amount of species and the International Species Information System has information on more than 1.8 million individual animals of 10,000 taxa (WAZA, 2005). A difficulty when assessing welfare in a zoo environment is this big amount of species. To make specific protocols for every species would mean a lot of work which could take time. Different species have evolved to cope with different environments and this makes it important to consider welfare at a species level and think of species-specific characteristics concerning for example dietary needs, hearing sensitivity and thermoregulatory and behavioural needs (Hill & Broom, 2009).

There is a big variation in the amount of research made on different species kept on zoos, where mammals, especially primates, have been prioritized in the research that has been made (Hill & Broom, 2009). Many species would profit from more research being made that could improve the ability to assess their welfare.

Even if from the same species, zoo animals often come from varying backgrounds which means that individuals can have different previous life experiences which can affect their ability to cope with certain environments and situations (Hill & Broom, 2009). This is different from farm animals where the background and life experiences are usually similar between individuals. To deal with this problem, Hill & Broom (2009) suggests using individuals as their on control to track the individual's responses to different changes and thereby assess the welfare of that individual animal.

In addition to this, the enclosures and environments in zoos may differ significantly between and within zoos. This could affect both the welfare of the animals but also the possibilities to perform a welfare assessment.

5.1.2 Behavioural measures

Behaviour could be a good way of measuring welfare since it can be inexpensive and a relatively obvious indicator on how an animal is coping with a specific situation (Hill & Broom, 2009). But depending on the time it takes to measure the behaviours of an animal, it could become an expensive measurement.

Even though different behaviours could be good indicators that an animal is having trouble coping with a specific environment or situation it can be misleading to only look at behaviour as an indicator since some species have evolved methods for hiding signs of welfare problems, such as pain (Sneddon *et al.*, 2014). I therefore believe that much information is needed about the different species full range of normal behaviour and how they are expressed when assessing zoo animal welfare.

It is also important to keep in mind that behaviours can also vary between different individuals or groups of the same species. For example chimpanzee using different tools in different regions depending on characteristics of prey (Sanz *et al.*, 2014). Furthermore, some behaviours, such as play, are sometimes seen more regularly in captive animals which does not necessarily mean that the performance of these behaviour is unnatural. These behaviours may occur more often because other behaviours, such as antipredatory tactics, are reduced since they are not as useful in a zoo environment (Hill & Broom, 2009).

5.1.3 Handling

Modern zoos train their animals for veterinary and husbandry purposes. The animals can for examples be trained for inspection and cleaning of teeth and body weight measurements and to move to a requested location or appear for a visual inspection (Young & Cipreste, 2004).

When working with some species and individuals it could be harder to assess the welfare if an animal needs to be anesthetized if it has to be controlled by a veterinarian. This could be depending on the amount of training that the individual has had and if it belongs to a species that could be dangerous to handle.

5.2 Criteria for assessing animal welfare in a zoo environment

Since there are so many different species and types of animals held in zoos, it is hard to make one welfare assessment protocol that fits all. It could therefore be a good idea to have general principles and criteria that are applicable across all species that can then be developed into measures that fits different species, similarly to the work of Welfare Quality®.

The principles and criteria of Welfare Quality® cover more aspects of welfare and give a big picture of the welfare of an animal. Even though the same principles and criteria could be used in a zoo environment as well, I believe some criteria could be added to ensure a more

holistic assessment of zoo animals since it is hard to make measures for each species. Examples of additions to the list of criteria are discussed below and listed in Table 4.

5.2.1 Encouraging foraging behaviour through nutritional enrichment

Working with different types of environmental enrichment is regular in many zoos and is used to improve the welfare of animals by adding stimulating husbandry activities to enhance the quality of life (Swaisgood & Shepherdson, 2005). Research has shown a direct link between environmental enrichment and welfare (Young, 2003) and it has been suggested as one of the most efficient and suited methods for decreasing stress, abnormal behaviours and frustration in captive animals (Mason *et al.,* 2007). Making enrichment a criterion for welfare assessment in zoos could therefore be an improvement for the welfare of zoo animals.

Since foraging behaviours are some of the more varied and complex behaviours carried out by wild animals while also being very motivating and engaging for captive animals, they are especially important when working with enrichment (Hocking *et al.,* 2015). To ensure a good welfare of the animals and reduce the risk of stereotypic behaviours I therefore believe it could be a good idea to add a criterion about "Encouraging foraging behaviour through nutritional enrichment".

5.2.2 Reproductive success

There is much evidence that environmental and social stressors can have a negative effect on the reproductive function of vertebrates (Wingfield & Sapolsky, 2003). As an example, it is suggested that stress, which is a sign of bad welfare, is a likely cause for reproductive problems of elephants kept in zoos (Clubb *et al.,* 2008).

Since conservation is such a big part of the work practices at zoos, it could be a good idea to include it in the overall welfare assessment work for zoos. This could for example be by including "Reproductive success" as a criterion for good welfare.

Table 4. An example of additions to the Welfare principles and criteria of Welfare Quality® to be better suitable for welfare assessment in a zoo environment.

Welfare principles	**Welfare criteria**
Good feeding	1. Absence of prolonged hunger 2. Absence of prolonged thirst 3. *Encouraging foraging behaviour through nutritional enrichment*
Good housing	4. Comfort around resting 5. Thermal comfort 6. Ease of movement
Good health	7. Absence of injuries 8. Absence of disease 9. Absence of pain induced by management procedures 10. *Reproductive success*
Appropriate behaviour	11. Expression of social behaviours 12. Expression of other behaviours 13. Good human-animal contact 14. Positive emotional state

5.3 Zoo welfare assessment in the future

A new question has come up while writing this report which is as follows:

- How do the example protocols from EAZA work in practice?

An investigation of this could give information to further develop welfare principles and criteria specific for a zoo environment using this report as ground work.

Even though there is collaboration within and between zoo organizations and zoos, animal welfare could only benefit from more collaboration. Making a general approach for welfare assessment with overall welfare principles and criteria could encourage zoos to cooperate in making more species-specific measures and protocols.
Besides collaborating in developing the welfare assessment further, zoos that are well-resourced and developed could offer their support and assist less-resourced zoos in assessing welfare. This could for example be through sharing knowledge on animal-management practices.

The information gathered through the assessment of animal welfare at zoos can further be used to improve best practice guidelines for the animals kept at zoos. To make sure that the welfare assessment is carried out as properly as possible, further research is needed on some species kept in zoos.

5.4 Sustainability

In 2017 the United Nations released 17 Sustainable Development Goals (United Nations, 2017). Goal 15 focuses on biodiversity, forests and desertification and among other things aims to halt the loss of biodiversity and prevent the extinction of threatened species. From this perspective it is important to develop a working system for assessing zoo animal welfare in order to make the work with conservation as successful as possible. Zoos are an important tool for conserving endangered species, some of which play important roles in their ecosystems.

5.5 Strengths and weaknesses – analysis of method and literature

5.5.1 Scientific literature

There is not just one way of assessing welfare and different articles seem to prefer different methods. This has made it difficult to know how objective the writers have been, and if they want to portray the method they prefer in a specific way.

A non-peer-reviewed reference was used from the website of Wild Welfare who had good ideas about why it is good for zoos to carry out a welfare assessment. Wild Welfare is an initiative set up by zoo professionals with the focus to improve welfare standards in facilities that keep wild animals. The source was valued to be trustworthy and safe to use. One disadvantage is that it is a source from the internet which means that it could easily be updated and changed.

One peer reviewed article, published by Mellor & Reid in 1994 were used. To complement this reference, updated work on this subjects have also been used in the report.

5.5.2 Chosen method

It was a good idea to do a literature study since there is a lot of literature to be found on the subject. One disadvantage with the amount of literature is that the articles contain a lot of different approaches and methods which have been hard to cover.

If the study was to be repeated a practical part would have been added if there would be a possibility and enough time. It would have been interesting to try both the example protocols from EAZA and a protocol from Welfare Quality® at a zoo to get a better understanding of how they work in practice. This would also make it easier to find difficulties when assessing animal welfare in a zoo environment.

5.6 Conclusions

How are current examples of welfare assessment protocols for zoo animals designed?

The study showed that there is a big difference in how detailed current examples of welfare assessment protocols for zoo animals are. It also showed that none of the studied protocols were made for assessing the welfare of a specific individual. The protocols are divided into different parts or categories which include a varying amount of measures.

What are the similarities and differences between the examples of protocols for zoo animals and the protocols for farm animals?

Comparing the example protocols from EAZA and the welfare assessment by Welfare Quality® showed that the EAZA protocols covered a varied amount of the welfare principles and criteria from Welfare Quality®. All four example protocols contained assessment concerning good feeding and good housing.

What difficulties exist when assessing animal welfare in a zoo environment?

Difficulties when assessing welfare in a zoo environment include the big amount of species kept in zoos, the handling processes used for wild animals but also the great individual variation within species, which may be due to for example different backgrounds and facilities. The study also showed that assessment can be challenging due to difficulties concerning behavioural measures and handling of animals.

How can the work with welfare assessment in a zoo environment be continued in the future?

In order to incorporate improvement of zoo animal welfare in an overall assessment of zoo animals it is suggested that two new criteria are added to the list of welfare criteria by Welfare Quality®. The suggested addition to the list of welfare criteria are “Encouraging foraging behaviour” and “Reproductive success”.

To further develop the welfare assessment of zoo animals, an investigation on how different example protocols for zoos work in practice should be made since such an investigation could give information to further develop welfare principles and criteria specific for a zoo environment. Furthermore, collaboration between zoos should be extended, both between zoos with a high level of resources but also between these zoos and zoos that might need help with their work.

More work on this topic has to be done to further develop principles and criteria for assessing animal welfare in a zoo environment.

6. Populärvetenskaplig sammanfattning

Moderna djurparker jobbar ofta med tre specifika mål, bevarande, forskning samt utbildning, och arbetet kring dessa mål påverkas av djurparksdjurens välfärd. För att uppnå ett lyckat bevarandearbete så vill man ha djur med hög reproduktionsförmåga, vilken kan försämras om det är så att djuren har en dålig välfärd. Individer i en djurpark fungerar ofta som

ambassadörer för sina vilda artfränder, både vid forskning och utbildning. När man vill ta reda på mer om en art genom att titta på individer i djurpark så är det viktigt att de är friska och uppvisar naturliga beteenden för att kunna representera de vilda artfränderna. Även när man utbildar och engagerar allmänheten så vill man kunna visa upp djur som har en god välfärd.

Då man jobbar med välfärdsbedömning i djurpark så finns det svårigheter gällande både beteendestudier och hantering av djur samt det stora antal arter som hålls på djurpark och olika bakgrunder hos individerna. Beteendestudier kan vara svåra på grund av att vissa arter har utvecklat metoder för att dölja välfärdsproblem, att beteenden kan variera mellan olika individer eller grupper av samma art samt att vissa beteenden ses mer i fångenskap än i det vilda. De olika arterna som hålls på djurparker har anpassats för olika miljöer vilket gör det viktigt att tänka på välfärden på artnivå och tänka på artspecifika behov gällande till exempel utfodring, ljudkänslighet och klimat. Olika bakgrunder hos djurparksdjur kan påverka individernas möjlighet att hantera en viss miljö eller situation.

Idag finns inte övergripande gemensamma protokoll mellan djurparker för att bedöma djurens välfärd, men inom välfärdsbedömning för produktionsdjur har arbetet kommit längre. Welfare Quality® var ett EU-finansierat projekt som syftade till att utveckla ett standardiserat system för att bedöma djurvälfärd, utveckla ett standardiserat sätt för att framföra mätningar till information om djurs välfärd samt att utveckla praktiska strategier eller mätningar för att förbättra djurs välfärd. Arbetet av Welfare Quality® jämfördes med den forskning som finns för välfärdsbedömning på djurparker samt med ett antal exempelprotkoll för välfärdsbedömning från den Europeiska djurparksföreningen (EAZA).

Welfare Quality® använder fyra välfärdsprinciper gällande bra utfodring, bra inhysning, bra hälsa och lämpligt beteende som tillsammans innefattar sammanlagt tolv välfärdskritrier. Dessa kriterier har sedan utvecklats till mått och protokoll för specifika arter. En jämförelse mellan dessa kriterier och välfärdsprotokollen från EAZA visar att exempelprotokollen täcker ett varierande antal av kriterierna.

På grund av det stora antal arter som hålls inom djurparker så kan det vara bra med generella principer och kriterier att applicera på alla arter som i framtiden kan utvecklas till mått och protokoll för specifika arter. För att jobba med en förbättring av välfärden hos djurparksdjuren föreslås att främjande av födosöksbeteende samt reproduktiv framgång tas med bland kriterierna för välfärdsbedömning på djurpark.

För att vidare utveckla arbetet med välfärdsbedömning på djurpark bör det undersökas och utvärderas hur olika protokoll fungerar praktiskt. Dessutom bör samarbete mellan djurparker utvecklas för ett arbete med utveckling av artspecifika välfärdsprotokoll.

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9. Appendix

9.1 Appendix A

Welfare Management Species Summary

SPECIES:

STOCK:

ENCLOSURES:

Welfare Audit Part	No Action		Low Priority Action		Medium Priority Action		High Priority Action		Total Number of Parameter	
	Number	%	Number	%	Number	%	Number	%	Number	%
Environment, Husbandry, Diet and Management									32	**38**
Behaviour									33	**39**
Reproduction, Morbidity and Mortality									19	**23**
Total									**84**	**100**

Description of Action Relating to Part 1

Priority	Problem	Solution	Strategic/ Departmental Action to be taken

Description of Actions Relating to Part 2

Priority	Problem	Solution	Strategic/ Departmental Action to be taken

Description of Actions Relating to Part 3

Priority	**Problem**	**Solution**	**Strategic/ Departmental Action to be taken**

Welfare Management Part 1 – Enclosure, Husbandry, Diet and Management

SPECIES:

STOCK:

ENCLOSURES:

Parameter	Defined Target	Current Situation	Assessment	Action Priority
State the indoor enclosure area (length (m) x height (m) x width (m))	m^3	m^3	Choose an item.	Choose an item.
State the outdoor enclosure area (length (m) x height (m) x width (m))	m^3	m^3	Choose an item.	Choose an item.
Does the area for retreat and flight meet the requirements set in the 'defined target'?		Choose an item.	Choose an item.	Choose an item.
Are the nest boxes, sleeping quarters or cubbing facilities for breeding animals set by the 'defined target' available?		Choose an item.	Choose an item.	Choose an item.
State the minimum and maximum temperature levels that fall within the enclosure.	Between Choose an item. and Choose an item. °C	Between Choose an item. and Choose an item. °C	Choose an item.	Choose an item.
State the minimum and maximum humidity levels that fall within the enclosure.	Between Choose an item. and Choose an item. %	Between Choose an item. and Choose an item. %	Choose an item.	Choose an item.
State whether or not the lighting required in the enclosure meets the 'defined target'?	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not the ventilation required in the enclosure meets the defined target?	Ventilation should be sufficient so that there is never any smell of ammonia or other noxious smells and that respiratory disease is not a recurring problem.	Choose an item.	Choose an item.	Choose an item.

Are the condensation levels the same or lower than the defined target?	Low	Choose an item.	Choose an item.	Choose an item.
If there is a supplementary water feature state whether or not the quality of water is suitable for drinking incl. temp.	Water feature required (10-15°C)	Choose an item.	Choose an item.	Choose an item.
Are suitable substrates provided according to the 'defined target'?		Choose an item.	Choose an item.	Choose an item.
Is drainage adequate according to the 'defined target'?	No poaching, pooling or excessive mud	Choose an item.	Choose an item.	Choose an item.
Are dust levels the same level or lower than the 'defined target'?	Low	Choose an item.	Choose an item.	Choose an item.
Is bedding be provided according to the 'defined target'?	Available in sufficient quantities, clean and changed regularly.	Choose an item.	Choose an item.	Choose an item.
Is drinking water provided according to the 'defined target'?	Clean and readily available	Choose an item.	Choose an item.	Choose an item.
Is enclosure furniture provided according to the 'defined target'?	No guidelines	Choose an item.	Choose an item.	Choose an item.
Are visual barriers available according to the 'defined target', which can be used by all animals simultaneously?	Plenty of visual barriers	Choose an item.	Choose an item.	Choose an item.
Are key resources (food) distributed according to 'defined target' so all animals have good access?	Food must be distributed evenly	Choose an item.	Choose an item.	Choose an item.
Do noise levels fit within the 'defined target'?	No excessive noise disturbance	Choose an item.	Choose an item.	Choose an item.
State whether or not pest control, as specified in the 'defined target' is implemented.	A programme should be in place	Choose an item.	Choose an item.	Choose an item.
Can isolation of individuals according to the 'defined target' be implemented?	Choose an item.	Choose an item.	Choose an item.	Choose an item.
Can manual restraint of individuals according to the 'defined target' be implemented?	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not the mechanical restraint devices		Choose an item.	Choose an item.	Choose an item.

specified in the 'defined target' are available?				
State whether or not training according to the 'defined target' has been undertaken?	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not loading and unloading of species can be completed according to the 'defined target'.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not the requirement for hoof, claw or beak care fits within the time set by the defined target.	Less than once every 2 years	Choose an item.	Choose an item.	Choose an item.
State whether or not Zoonotic disease control, as specified in the 'defined target' is implemented.	A programme should be in place	Choose an item.	Choose an item.	Choose an item.
State whether or not body weight of species is within the 'defined target'	Within 10% of average for species.	Choose an item.	Choose an item.	Choose an item.
State whether or not the diet sheet is reviewed and implemented according to the 'defined target'	Should be reviewed regularly and should take into account the age and sex of the animals.	Choose an item.	Choose an item.	Choose an item.
State whether or not grazing and browse is provided according to the 'defined target'	Choose an item. Note: that many hoofstock/primates are folivores/herbivores and should have daily access to forage and browse	Choose an item.	Choose an item.	Choose an item.
State whether or not enrichment is provided according to the 'defined target'.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not all animals can be individually identified according to the 'defined target'	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Welfare Audit Part 2 – Behaviour

SPECIES:

STOCK:

ENCLOSURES:

Behaviour	Presence or Absence	Frequency	Assessment	Action priority
State whether or not all animals are integrated into the main group	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not all animals are utilising enrichment items	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not all animals are using the outdoor enclosure	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not all animals are utilising enclosure furniture	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display vocalisation behaviour	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display fear response behaviour	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display excessive self grooming/preening behaviour	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display self harming (including feather plucking) behaviour	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals present with regurgitation or vomiting	Choose an item.	Choose an item.	Choose an item.	Choose an item.

State whether or not animals re-ingest regurgitated or vomited food	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display coprophagy (eating faeces) behaviour	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display pacing behaviour?	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display rocking or swaying behaviour	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display circling behaviour	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display tongue or lip repetitive behaviours	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display any other repetitive behaviours – (describe below) **----------** **----------**	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display aggression to co-specifics	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display aggression to young in group	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display flight behaviour from co-specifics	Choose an item.	Choose an item.	Choose an item.	Choose an item.

State whether or not animals display hiding behaviour from co-specifics	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not some animals restrict co-specifics from food	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display excessive grooming/preening behaviour of other group members	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not adult animals display excessive grooming of infants	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not female animals display oestrus behaviour	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display courtship and or mating behaviour	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals react to external noises	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals react to neighbouring animals	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display begging towards visitors	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display begging behaviour towards keepers	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display fear or stress towards visitors	Choose an item.	Choose an item.	Choose an item.	Choose an item.

State whether or not animals display fear or stress towards keepers	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display behaviours resulting from imprinting on keepers	Choose an item.	Choose an item.	Choose an item.	Choose an item.
State whether or not animals display inappropriate sexual behaviour directed at humans	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Welfare Audit Part 3 – Social Grouping, Reproduction, Mortality and Morbidity Review

SPECIES:

STOCK:

ENCLOSURES:

Parameter	Defined Target[1]	Current Situation[2]	Assessment	Action Priority
State the normal family group composition		State the stock ratio for each group in the collection _____	Acceptable / Not Acceptable	None / Low / Medium / High
State whether the species is monogamous or polygamous	Monogamous / Polgyamous / Polygynous / Polygynandrous	Monogamous / Polgyamous / Polygynous / Polygynandrous	Acceptable / Not Acceptable	None / Low / Medium / High
If appropriate state which sex is the dominant sex	Neither/ Male / Female / Hermaphrodites	Neither/ Male / Female / Hermaphrodites	Acceptable / Not Acceptable	None / Low / Medium / High
State the age for which offspring are expected to disperse from the natal group	Unknown / ___years/ ___months	Unknown / ___years/ ___months	Acceptable / Not Acceptable	None / Low / Medium / High
State which sex disperse from the natal group	Male and Female / Male / Female / Neither	Male and Female / Male / Female / Neither	Acceptable / Not Acceptable	None / Low / Medium / High
Can bachelor groups develop for this species?	Yes / No	Yes / No	Acceptable / Not Acceptable	None / Low / Medium / High
State whether or not an ESB/EEP breeding recommendation is required for this species.	Yes / No (recommended by ESB/EEP)	Yes / No	Acceptable / Not Acceptable	None / Low / Medium / High
State whether or not an ESB/EEP contraceptive recommendation has been implemented for this species.	Yes / No (recommended by ESB/EEP)	Yes / No	Acceptable / Not Acceptable	None / Low / Medium / High

State whether or not a specific ESB/EEP reproductive recommendation for of this species has been implemented. **(Light levels, temperature, housing facilities, group composition)**	None / Specific requirement (state): _____ _____	N/A /None / Specific requirement (state): _____ _____	Acceptable / Not Acceptable	None / Low / Medium / High
State the age at first breeding	_____years	_____years	Acceptable / Not Acceptable	None / Low / Medium / High
State the average number of offspring per pregnancy/clutch for this species	_____per litter/clutch	_____per litter/clutch	Acceptable / Not Acceptable	None / Low / Medium / High
State the inter-birth interval for this species	Unknown / ___years/ ___months	Unknown / ___years/ ___months	Acceptable / Not Acceptable	None / Low / Medium / High
State any birthing / rearing problems in last 2 years that have been experienced with this species			Acceptable / Not Acceptable	None / Low / Medium / High
State the average life span of this species in captivity	_____years	On going / ____years / ____months	Acceptable / Not Acceptable	None / Low / Medium / High
State the number of deaths in the collection in the last 3 years	N/A		Acceptable / Not Acceptable	None / Low / Medium / High
State the % of deaths in the last 3 years that reached 75% of life expectancy	100%		Acceptable / Not Acceptable	None / Low / Medium / High
State the number of veterinary interventions per animal per year = No of interventions/Total number of animals held in collection in 2 year period.	<3		Acceptable / Not Acceptable	None / Low / Medium / High

State the chronic condition rate of this species = Number of animals on long term medication / Total numbers of animals held in collection in the past *6 months*	None		Acceptable / Not Acceptable	None / Low / Medium / High
State the any recurring clinical issues presented by this species in last 2 years	None		Acceptable / Not Acceptable	None / Low / Medium / High

[1]State in the Defined Target Box if this species has a breeding recommendation either from the EEP/ESB or Life Sciences Management.
[2] State in the Defined Target box if this contraception is approved by the EEP/ESB or if authorised by the Life Sciences Management.
[3] State in the Defined Target box if this species has specific requirements to stimulate breeding, for example light levels, temperature, housing facilities, group composition. In the Current Situation box describe if these have been met.
[4] A veterinary intervention is a procedure requiring a General Anaesthetic.

9.2 Appendix B

1 - Meets Criteria **0 - Does Not Meet Criteria** **N/A - Not Applicable**

The goal of this welfare management tool is to assess inputs (what we provide for the animals) and to consider outputs (what the animal experiences). Measuring Welfare requires us to assess the responses of our animals to their environment. Measuring affective states (emotional response) of our animals in a question-based management tool is challenging. However, the output reveals conditions which provide an insight into the welfare of an individual animal at [redacted]

Species Name					
Number of Individuals (list 0.0.0)					
Veterinary & General Health					
All animals are in good health.					
Animals are not underweight.					
Animals are not overweight.					
Evidence of regular weight recording & graphing by keepers.					
There are no chronic health issues (including signs of ageing).					
Operant conditioning training is in place for Veterinary and routine husbandry care. Review training logs as required					
If no operant conditioning training is provided the provision of veterinary care is carried out in a way that minimizes stress. (Consider - netting or darting capture methods, access to animals and facility such as stocks or crush systems). **List issue in NOTES and add to Action Plan**					
Preventative medicine – vaccinations/worming/testing up to date as indicated in the Disease Surveillance Plan. (Refer to Veterinary Records)					
Routine procedures as required are carried out for this species e.g. talons, hoofs or N/A					
Animals can be kept separate for medical treatment/observations/samples					
If required - isolation is available for this species.					
The non-primary holding areas provide adequate complexity for the time the animal/s must be housed there.					

Reproduction					
Reproduction – animals reproduce regularly w/out issues (N/A is bachelor group or single sex).					
A high rate of survival of offspring is achieved. (N/A for single sex housing)					
Behaviour					
Social Group & Stability is good (consider aggression, affiliative behaviour etc. & check daily records/ZIMS) as well as current observation.					
Behaviour –the animal/s are NOT exhibiting abnormal or stereotypical behaviour. **If ARB's are known list in notes.**					
If stereotypical or abnormal behaviour is known, there is an understanding by keepers & management as to what may be causing it. (Use N/A as required)					
If animals are exhibiting stereotypical behaviour measures are in place to address the individuals ARB's					
Programme of behavioural enrichment is used, reviewed and animals are using the enrichment provided. (Review evaluation records).					
Animal expresses a variety of speciesspecific/species typical behaviours.					
The animal/s has/have choice & control over their environment (they are not locked out or locked in or restricted outside of normal husbandry routines and procedures).					
Each animal has the ability to avoid conspecifics or other species in their habitat.					
Keeper/Animal Relationship is/are positive (check feedback both daily care sheets & training/enrichment activities – keeper as required).					
If keeper/animal relationship is not positive are steps are in place to make the relationship more positive. **List steps in notes section**					
Disturbance and Noise is minimal (If high volume area - behavioural observations have been carried out and/or measures have been put in place to minimize or mitigate – such as polycarbonate or other sound barriers (if true indicate with 1 that it has met criteria).					

Husbandry					
Nutrition and Diet is appropriate for the species					
A diet sheet is available for this species (pls check kitchen/food prep area).					
Food presentation – all food is being presented in a manner that is appropriate for the species. Taste, content, textures, timing.					
Browse is available to animals that require it.					
Drinking Water - provision of, access to and quality/cleanliness are all of a high standard.					
There is no pooling of urine of faecal matter and no poaching of the ground.					
The indoor enclosure does NOT smell of ammonia.					
Hygiene & Cleanliness of the enclosures interior & exterior space is of a high standard.					
Bedding Materials are adequate and varied for the species.					
Dust levels in the interior aspect of the enclosure are minimal (physically check bedding, window sills, exposed surfaces for dust).					
Indoor Enclosure Substrates adequate for species and complexity for species (fossorial, foraging etc.).					
The number of animals is less than carrying capacity and is not overstocked.					
Carrying capacity will not be overstocked within the year.					
There are no health issues related to stocking density.					
Enclosure Features					
The enclosure features an adequate & appropriate number of shelters & retreats & off show/oos provision from visitors/conspecifics. Flighted birds have perching choices off and onshow.					

Planting & vegetation is adequate for the species – providing cover, microclimate provision & varied substrate.					
Enclosure Furnishings appropriate for the species and accessible (can flighted birds fly and perch properly – extend the longest length of enclosure).					
There is evidence of changing environmental features and furnishings – NOT static.					
Water feature if part of the animal's ecology is available and is large and deep enough.					
Climate					
Temperature – gradients interior/exterior (graphing as applicable) This includes adequate cooling in the hottest weather and warmth in the coldest weather.					
Humidity proper percentage for species (pls check records and graphs as applicable).					
Lighting & UV lighting – provision & accessibility as applicable.					
Ventilation – interior enclosure and exterior as applicable.					
General Maintenance					
Drainage there is no pooling of rainwater etc.					
Safety and security of animal are satisfactory– check overhangs & structure (must review maintenance record book for routine checks).					
Pest Control – evidence of control & methods efficacy (there is no faeces urine detected or presence of rodents or other pest species).					
TOTAL – NOT MEETING CRITERIA					

YOU MUST TRANSFER ALL THOSE AREAS NOT MEETING THE CRITERIA TO THE WELFARE MANAGEMENT SYSTEM ACTION PLAN

Additional Notes:

WELFARE MANAGEMENT SYSTEM – ACTION PLAN

Species	*Issue*	*Solution*	*Who – Keeper/Mgmt./Dept.*	*Priority – Low, Medium or High*

9.3 Appendix C

An Animal Welfare Framework for Zoos and Aquariums

Checklist of 95 questions to assess an animal's welfare, divided into five sections (nutrition, environment, physical health, behaviour and management) (see Table 1 for key to response options and classification of questions):

Name of institution:
Name of species or exhibit assessed (if applicable):
Name of assessor(s):
Date of assessment:
Date of next scheduled assessment (if applicable):

Section A: Nutrition

An institution should ensure that clean water and a nutritionally appropriate diet are provided to optimise an animal's welfare. Presenting food in a way that satisfies an animal's natural feeding behavioural requirements and motivations also promotes positive welfare. Foraging/hunting or simply acquiring food can be a significant part of an animal's activity and food-related enrichment should form an integral part of environmental enrichment programmes (see "Behaviour" below). The preparation and storage of food for the animals should be carried out in a dedicated area that is hygienic, where food is protected from damp and contamination; perishable foods should be kept refrigerated. Feeding and drinking receptacles in the exhibits should be cleaned daily and uneaten food removed regularly to optimise a healthy environment. The welfare of animals used as food should be considered; in particular, live vertebrate prey should only be fed to other animals under controlled and justified circumstances, and under veterinary advice. Where it has to be undertaken, it is recommended that a written justification and ethical review process is undertaken and agreed by senior staff, weighing up the welfare of predator and prey. Finally, to protect an animal's health and prevent abnormal behaviours such as begging arising, unregulated feeding of the animals by visitors should not take place.

No	Question	Category: Care given /Welfare experienced	Acceptable	Questionable	Unacceptable	Not Applicable	Not Assessed
1	Do all animals have ready access to plenty of clean, potable water?	W					
2	Is the quantity of food provided for the animals documented, adequate and the consumption thereof monitored?	C					
3	Does the provided food and its quality meet the specific nutritional requirements of each species and each individual animal?	C					
4	If necessary, is dietary supplementation given to the animals?	C					
5	Are supplies of food and drink prepared and stored under hygienic conditions?	C					
6	Is the manner of feeding safe for both the animals and staff?	C					
7	Are there enough food and drinking sites so as to be accessible to every individual animal within a particular enclosure?	W					
8	Are food and drink provided in such a way that they meet the animals' physiological and behavioural needs?	W					
9	Are feeding enrichment techniques used for the animals?	W					
10	Are the diets for the animals reviewed regularly?	C					

11	Are there feeding protocols in place should hand-rearing of animals be necessary?	C					
12	If live vertebrates offered as food to other animals, has an appropriate ethical review taken place and efforts been taken to minimize this practice and minimize the welfare impact on the prey animal?	C					
13	Does unregulated feeding of the animals by visitors take place?	C					
14	If regulated feeding of specific animals by visitors is permitted, is it adequately supervised, controlled and managed?	C					
	Section total for each response option						

Detailed notes (e.g. to rationalise concerns identified):

For a more advanced assessment, answer questions 1.1 to 1.5 under "Domain 1 – Nutrition" in Suppl. 2.

Section B: Environment

It is important that exhibits are designed to meet an animal's physical and psychological requirements at all times and throughout its entire lifetime. Exhibit size, shape and layout should be designed based on a thorough understanding of the species' biology to provide opportunities for an animal to perform natural and normal behaviours at all times, have places for refuge from visitors and protection from injury and aggression between conspecifics. The ability to provide appropriate temperatures, ventilation, lighting and humidity and to control the level of noise is important for an animal's welfare. All off-exhibit and quarantine facilities should be of similarly high standard as on-exhibit facilities and provide species-appropriate accommodation (with special consideration of where the animals spend the majority of their time daily and seasonally). Importantly, exhibit design should allow for appropriate human intervention that minimises stress to the animals, including capture, handling, cleaning and maintenance, and general husbandry and veterinary practices. Institutions should only consider keeping those species that can be provided with the appropriate environmental requirements. Interactions between the animals and visitors should be strictly regulated to adequately protect an animal's welfare, as well as the health and safety of the staff and visitors. Visitor–animal interactions that are detrimental to an animal's welfare should not be undertaken.

No	Question	Category: Care given /Welfare experienced	Acceptable	Questionable	Unacceptable	Not Applicable	Not Assessed
		C/W	Ac	Qu	Un	N/Ap	N/As
15	Do the majority of enclosures (>90%) appear to be well maintained?	C					
16	Do the majority of enclosures (>90%) provide for the animals' well-being throughout the year?	W					
17	Are the environmental temperature and humidity levels maintained appropriate for the animals?	C/W					
18	Is there adequate ventilation and lighting for the animals in indoor and holding areas?	C/W					
19	Are any enclosures located where there is loud or excessive noise that may disturb the animals?	W					
20	Are the majority of enclosure substrates, design features and furniture (>90%) sufficient to provide enough shelter and	W					

	refuge for all animals, including those kept in multi-species exhibits?						
21	Are the majority of enclosure substrates, design features and furniture (>90%) sufficient to provide for the behavioural needs of all animals, including those kept in multi-species exhibits?	W					
22	In aquatic enclosures, are appropriate water quality parameters measured and controlled to ensure that the water quality is suitable for the animals?	C/W					
23	Can staff service all enclosures in a manner that is both safe to themselves and the animals, without the animals being negatively impacted?	C/W					
24	Are any animals restrained or tethered for an unnecessary amount of time?	W					
25	Are the enclosures and barriers designed, constructed and in such a condition to safely contain the animals within the desired enclosures?	C					
26	Are the enclosures free from vegetation or other items that would aid animal escape?	C					
27	Are appropriate and regular assessments of visitor–animal interactions carried out and documented?	W					
28	Are appropriate and regular assessments of contact situations outside of the institution (e.g. outreach) carried out and documented?	W					
	Section total for each response option						

Detailed notes (e.g. to rationalise concerns identified):

For a more advanced assessment, answer questions 2.1 to 2.6 under “Domain 2 – Environment” in Suppl. 2.

Section C: Physical Health

A fundamental requirement for good welfare is the maintenance of good health. Institutions should have appropriate husbandry and management procedures in place to provide good health to all animals in their care. Key elements to good health are proactive health care and preventative medicine programmes. All animals should be kept in good physical condition and demonstrate normal, expected and positive behaviours, growth, reproduction and life expectancy. An animal demonstrating disease, trauma, pain, abnormal behaviours or distress should be attended to immediately by an appropriately trained veterinarian or other qualified staff. The methods used for handling animals for any purpose should minimise, as much as possible, the stress experienced by the animals and the potential for trauma.

No	Question	Category: Care given /Welfare experienced	Acceptable	Questionable	Unacceptable	Not Applicable	Not Assessed
		C/W	Ac	Qu	Un	N/Ap	N/As
29	Do the animals have any obvious signs of injury or illness?	W					
30	Do mutilation procedures (e.g. de-clawing, pinioning, removal of teeth) appear to have been carried out on any animals and is the animals’ health negatively impacted?	W					

31	Are the animals generally in good physical condition?	W					
32	Are there any animals that are severely underweight?	W					
33	Are there any animals that are severely overweight?	W					
34	Are the crating and transport facilities appropriate to minimise the animals' stress and the potential for trauma?	C					
35	Are routine veterinary examinations performed prior to transporting animals?	C					
36	Are appropriate biosecurity and quarantine procedures implemented for all newly acquired animals and for animals suspected or known to be carrying infectious diseases?	C					
37	Are animal acquisition and disposition activities legal and ethical / with appropriate checks on the husbandry and welfare standards of the receiving collection?	C/W					
	Section total for each response option						

Detailed notes (e.g. to rationalise concerns identified):

For a more advanced assessment, answer questions 3.1 to 3.3 under "Domain 3 – Physical Health" in Suppl. 2.

Section D: Behaviour

Most natural and normal behaviours are a good indication of positive welfare. This includes social interactions and social species should always be kept in compatible social groups; however, overcrowding should be prevented, as it may cause distress and aggression. Environmental enrichment should be provided to encourage normal and positive behavioural patterns and to enable behaviours that, if not fulfilled, may lead to abnormal behaviours, and should be part of the daily animal care routine. The ability to assess welfare by staff should be encouraged, as it means immediate and appropriate action can be taken if an animal is injured or unwell, or if an animal shows behaviours that may suggest poor welfare (e.g. abnormal behaviours). Training may be required for the treatment, movement and care of the animals to reduce stress and ensure their positive welfare, using training techniques such as positive reinforcement. Training techniques involving physical punishment, or practices that compromise an animal's health, development or psychological well-being, should not be used.

No	Question	Category: Care given /Welfare experienced	Acceptable	Questionable	Unacceptable	Not Applicable	Not Assessed
		C/W	Ac	Qu	Un	N/Ap	N/As
38	Where appropriate, are the animals maintained in social groups of suitable composition (e.g. number, age and sex ratio) and is the social situation (also for solitary species) suitable for the individual animals?	W					
39	Are there any species that are naturally social currently housed in enclosures on their own? Are adequate measures in place to meet their social needs / to rectify this situation?	W					

40	Does management practice ensure that undue dominance by individual animals (e.g. hyper-aggression towards conspecifics) is avoided?	W					
41	Does management practice ensure that persistent and unresolved conflict between animals is avoided?	W					
42	Do indoor, outdoor and holding enclosure areas all allow for normal behavioural patterns and ranges of movements to be expressed?	W					
43	Is environmental enrichment regularly provided to the animals?	C					
44	Are the animals generally bright, alert and interested and engaged in their surroundings?	W					
45	Are positive animal behaviours (e.g. play, exploration, relaxed resting, species-appropriate feeding and social behaviours) observed?	W					
46	Are negative animal behaviours (e.g. over-grooming, stereotypic/repetitive behaviours, hyper-aggression, apathy) observed and are plans in place to address them?	W					
47	Are appropriate barriers used to assist with training animals?	C					
48	Is physical punishment of any animals ever used?	W					
49	Is there regular monitoring and review of the animals' welfare within contact and training programmes?	C					
	Section total for each response option						

Detailed notes (e.g. to rationalise concerns identified):

For a more advanced assessment, answer questions 4.1 to 4.6 under "Domain 4 – Behaviour" in Suppl. 2.

Section E: Management

Negative experiences and environments that cause fear and distress or prevent positive experiences should be avoided. Management and husbandry practices should consider the specific species' requirements to promote positive experiences throughout an animal's lifetime. Good preventative medicine and veterinary records, alongside appropriate capture, diagnostic and treatment facilities, are essential for any institution and good veterinary provisions should always be available. A comprehensive programme of care should be established at a level that is consistent with the overall welfare needs of all animals, and maintained under the supervision of an experienced veterinarian. If specific veterinary care cannot be provided for a species, that species should not be held at the institution. Euthanasia should be carried out where an animal's welfare is severely compromised and cannot be adequately improved through veterinary care and management. Euthanasia should be undertaken in a stress-free manner that involves a rapid and painless death and performed by staff trained in the handling of animals and administration of euthanasia drugs. Records, policies and reviews of all management activities that can affect an animal's welfare should be kept. Collection planning, animal escapes, population management, animal training, animal handling and veterinary/euthanasia protocols should be in place to monitor animal welfare at an institutional level and indicate where continued evaluation is required. In particular, all animals should be recorded individually, thereby contributing to a long-term archive system (e.g. ZIMS). These records provide important information that relate to the management, veterinary care, health and welfare of the animals.

No	Question	Category: Care given /Welfare experienced	Acceptable	Questionable	Unacceptable	Not Applicable	Not Assessed
		C/W	Ac	Qu	Un	N/Ap	N/As
50	Is the animal collection under the supervision of a qualified veterinarian?	C					
51	Does the level of veterinary supervision and care provided appear to be adequate for the size of the institution and number of animals accommodated?	C					
52	Is there clear, effective communication between the veterinarian and animal care staff?	C					
53	Is the response time between noticing/reporting an animal health problem and receipt of appropriate veterinary care adequate?	C					
54	Is the veterinary examination/treatment room adequate and does it have suitable facilities to meet the needs of the animal collection?	C					
55	Is there proper, secure management of all veterinary medicines?	C					
56	Are the quarantine facilities and quarantine protocols appropriate?	C					
57	Are the biosecurity measures in place sufficient and suitable?	C					
58	Is the frequency of visual inspection of the animals by animal care staff suitable and the protocol for reporting health concerns effective?	C					
59	Are animal care staff observations of general animal health and behaviour routinely recorded?	C					
60	Is the frequency of routine clinical examinations for all animals appropriate?	C					
61	Is there a suitable preventative medicine programme in place for the animals?	C					
62	Does the institution normally perform (or externally commission) necropsies on deceased animals?	C					
63	Are suitable samples from necropsies of deceased animals submitted for pathological analysis?	C					
64	Are deceased animals stored away from food and disposed of appropriately?	C					
65	Is there a safe and effective programme to prevent an uncontrolled build-up of parasites and for the control of pests and, where necessary, predators?	C					
66	Is there well-maintained and appropriate animal capture equipment available on site, along with a sufficient number of trained staff to use it?	C					
67	Does the institution maintain up-to-date veterinary records on the health of the individual animals?	C					
68	Does regular review of clinical records, animal health management and disease issues take place?	C					

69	Are there written protocols for the euthanasia of animals in place, not the least to ensure that suffering is minimised during the process?	C					
70	Is euthanasia carried out under veterinary supervision, or by a competent, senior staff member properly trained and experienced in the techniques used, who has access to the necessary equipment and facilities and who is available at all times?	W					
71	Are the circumstances mandating euthanasia or humane killing of animals appropriate?	C					
72	Is there any form of ethical review or oversight (e.g. decision tree) of euthanasia to reduce prolonged end-of-life suffering?	C					
73	Does management practice ensure that physical carrying capacity is not overburdened and that the animals are not negatively impacted by overcrowding?	C/W					
74	Is the total number of animals accommodated appropriate for the area of land occupied by the institution and the available resources?	W					
75	Where appropriate, is separate accommodation provided for pregnant females, animals with young and individual animals that are physically or functionally impaired?	C					
76	Are any animals kept in temporary accommodation? If yes, is their situation regularly and appropriately assessed?	C					
77	If there are free-ranging animals on site (e.g. peacocks, guinea fowls), are they monitored and is there a documented husbandry and management protocol in place for their care?	C					
78	Are up-to-date and long-term records (including husbandry details, daily behavioural observations, etc.) kept for all individual animals?	C					
79	Is the system of recording animal management information easy to search, secure and fit for purpose?	C					
80	Does the institution's collection plan adequately considers animal welfare?	C					
81	Can all animals held at the institution be individually identified (or as a group, if applicable) by appropriate methods that do not negatively impact the animals' health or welfare?	C/W					
82	Where appropriate, are adequate standoff barriers provided to prevent direct contact between visitors and enclosures?	C					
83	Are animals handled only by or under the supervision of authorised staff?	C/W					

84	Is the handling of animals by staff carried out with the necessary and appropriate care and consideration?	W					
85	If there are any animal training programmes in place, are they documented and appropriate in technique, duration and purpose?	C					
86	Is animal population management regularly reviewed?	C					
87	Are there records kept of the movement of animals into and out of the institution?	C					
88	Is there a suitable emergency response procedure and appropriate equipment (medical and capture) in place in the event of a dangerous animal escape?	C					
89	Do staff members receive training in animal health, disinfection principles and hygiene practices?	C					
90	Does the institution have clear procedures for working with hazardous animals?	C					
91	Does the total financial support appear to be adequate to meet the needs of the institution and the welfare needs of the animals within it?	C					
92	Is the staffing level appropriate to provide the required standards of animal husbandry and care?	C					
93	Do staff members regularly meet to discuss problems and possible solutions?	C					
94	Are animal care staff up to date with developments in their field of expertise?	C					
95	Does the institution provide suitable staff training and further development?	C					
	Section total for each response option						

Detailed notes (e.g. to rationalise concerns identified):

	Question	**Category: Care given /Welfare experienced**	**Acceptable**	**Questionable**	**Unacceptable**	**Not Applicable**	**Not Assessed**
		C/W	**Ac**	**Qu**	**Un**	**N/Ap**	**N/As**
	Overall total for each response option						

Recommendations and referenced records (e.g. to rationalise recommendations generated):

9.4 Appendix D

Isolated Welfare Issue Report – Instructions for completion

Description: Please include any information relating to previous actions taken, if a welfare audit already exists etc.
Mitigations: How can this issue be resolved? If no mitigation can be identified at this stage, please indicate what actions you would like AWO to take e.g. observational study, set-up meeting with other departments etc…
Costs: Please indicate if these are approximate or quoted from a specific company, and whether or not they come out of your standard department budget.
Other information: You can submit pictures, references, audits or any other supporting info as appropriate.

Measure of severity	**0** **Animal cannot cope**	**1** **Animal is challenged**	**2** **Animal is surviving**	**3** **Animal is thriving**
Health	Animal requires long term intervention and normal behaviours are prevented.	Repeated interventions occur, natural behaviours may be restricted	Occasional short term intervention required, most normal behaviours occur	Animal is consistently in peak condition, no intervention required
Physical condition / Injury / Illness / Parasites				
Environment	Optimal conditions are not available	For long periods (weeks or months) optimal conditions are not available	For short periods (hours or days) optimal conditions are not available	Animal always has choice to be in optimal conditions
Temperature / Water & humidity / Light / Surfaces / Cover & privacy / Spatial complexity				
Behaviour	No ability to perform behaviours	Ability to perform behaviours is restricted in terms of variety or duration	For short periods (hours or days) the animal is unable to perform a full range of behaviours	The animal always has the choice to perform a full range of behaviours
Social / Foraging & feeding / Species specific / Sensory / Locomotory				
Stressors	Animal cannot avoid stressor. Abnormal or negative behaviours are displayed when stressor is present.	There are times when the animal cannot choose to avoid the stressor and / or abnormal or negative behaviours are sometimes observed.	There are times when the animal cannot choose to avoid the stressor, but no identified abnormal or negatives behaviours are observed.	Animal always has the choice to avoid the stressor. No negative or abnormal behaviours are displayed.
Visitors / Events / Transport / Veterinary / Sensory / Competition				

Isolated Welfare Issue Report

Date		**Submitted by**	
Zoo	Choose an item.	**Seen by Team Leader**	
Section		**Seen by Curator**	
Enclosure (s)		**Seen by Zoo Manager**	
House name		**Species**	
ZIMS #			

Description of issue	
Suggested mitigations	
Anticipated costs	
Any other information	

Severity				**Breadth**	**Welfare priority**
Health	**Environment**	**Behaviour**	**Stressor**		
Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.	

Response from Animal Welfare Officer:
Response from Animal Welfare Group:
Response from Animal Welfare Committee:

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